FIG. 1

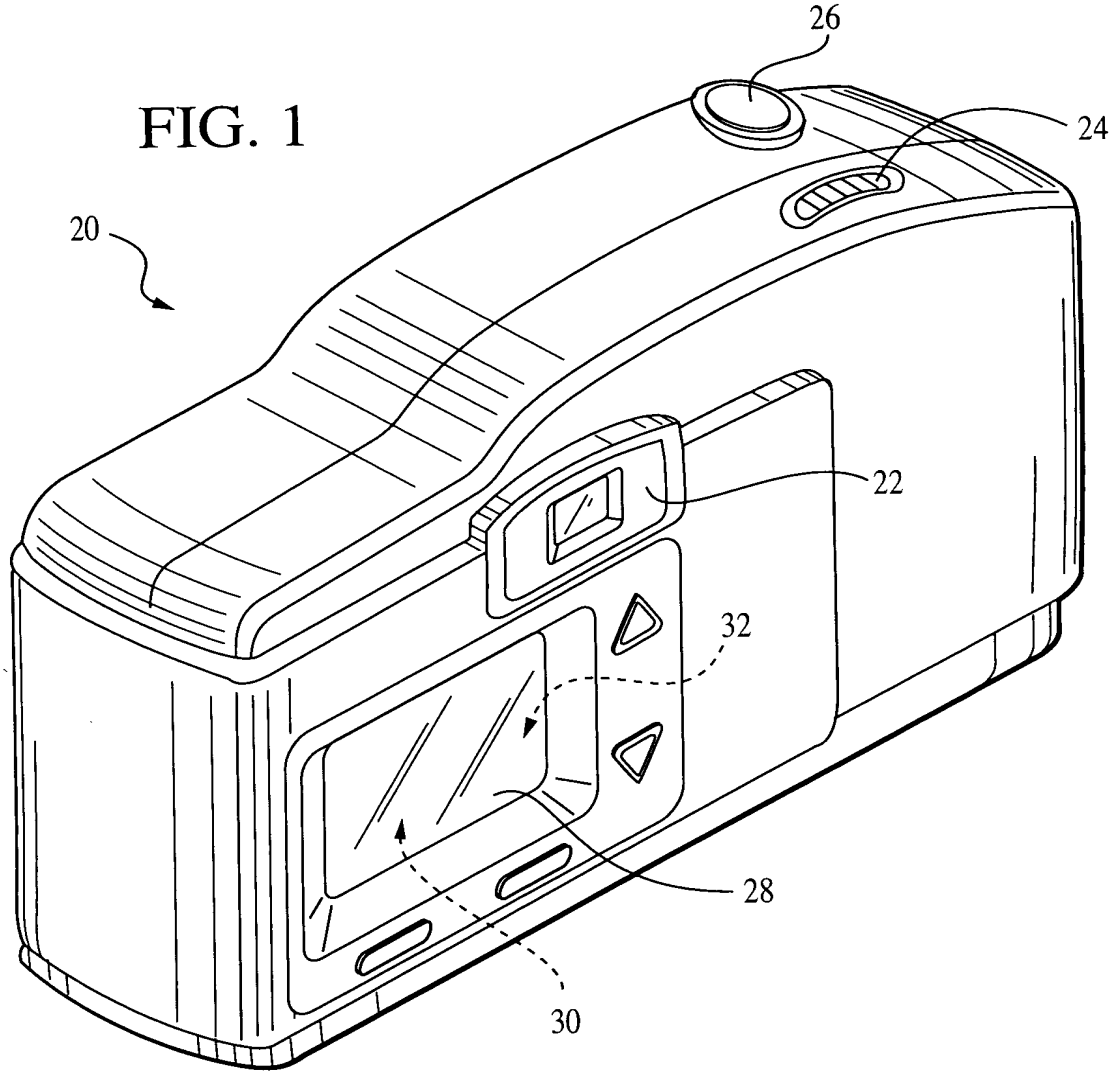


FIG. 2

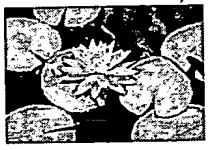
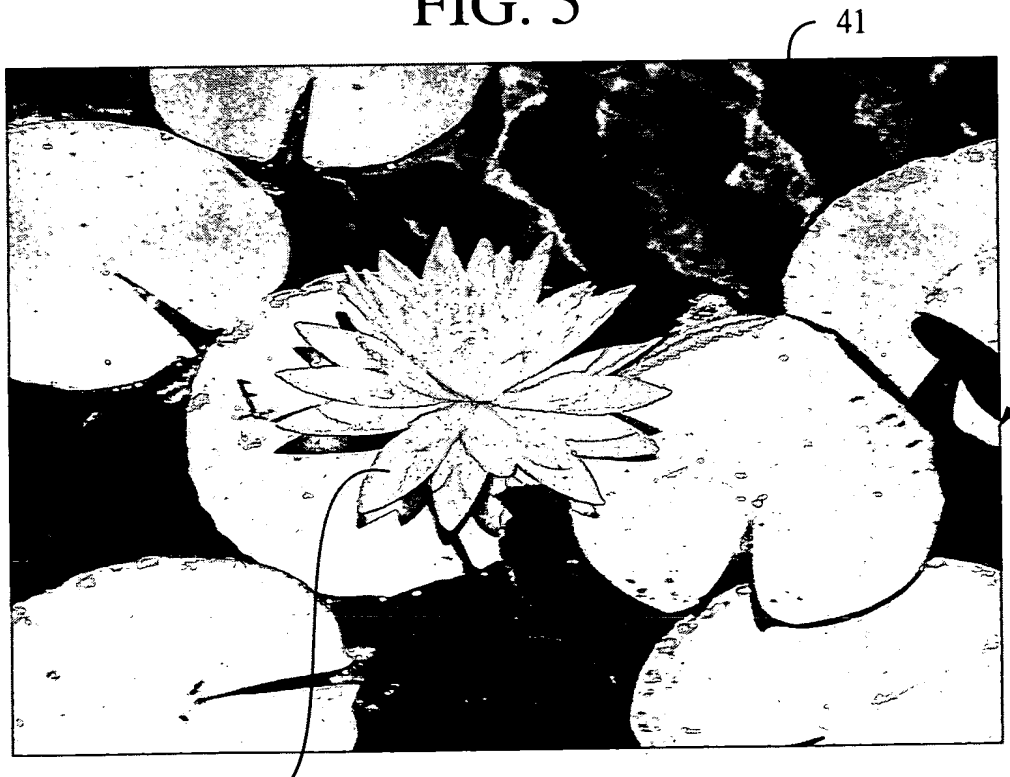


FIG. 3

FIG. 4

FIG. 5



20220607

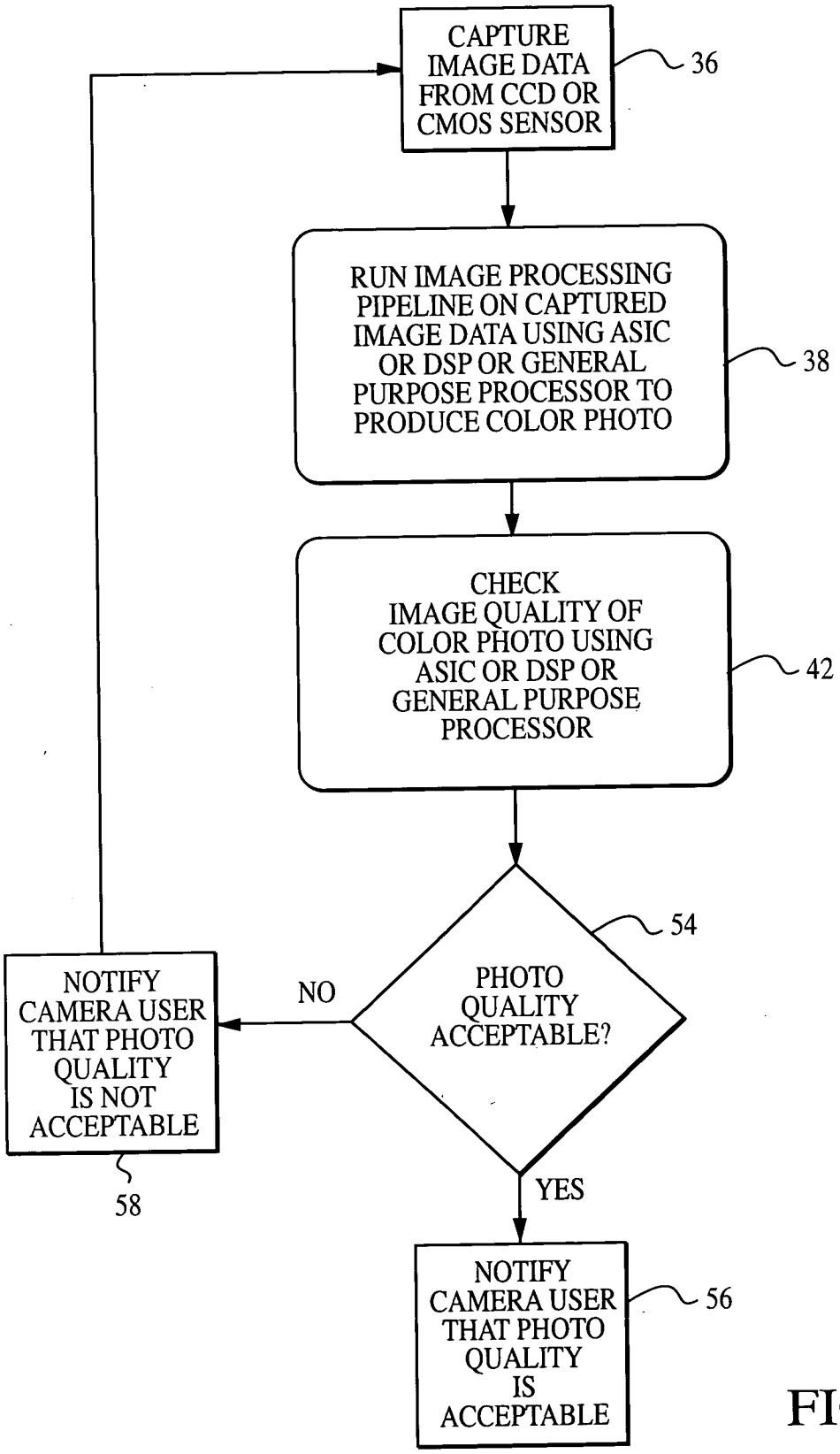
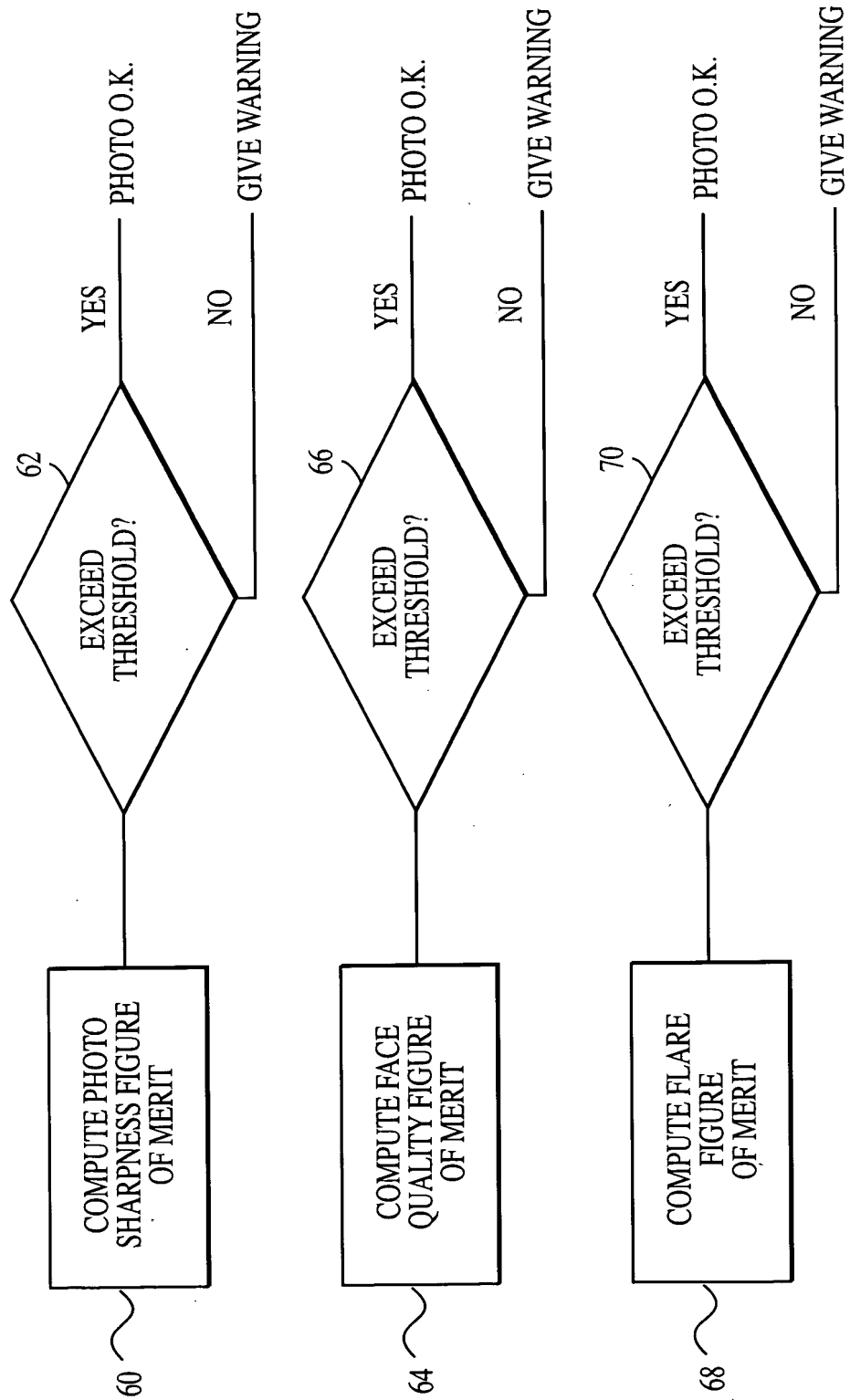


FIG. 6

FIG. 7


COMPUTE PHOTO SHARPNESS FIGURE OF MERIT
60
EXCEED THRESHOLD?
62
YES
PHOTO O.K.
NO
GIVE WARNING
COMPUTE FACE QUALITY FIGURE OF MERIT
64
EXCEED THRESHOLD?
66
YES
PHOTO O.K.
NO
GIVE WARNING
COMPUTE FLARE FIGURE OF MERIT
68
EXCEED THRESHOLD?
70
YES
PHOTO O.K.
NO
GIVE WARNING

09/529,528 6/15/2000

FIG. 8

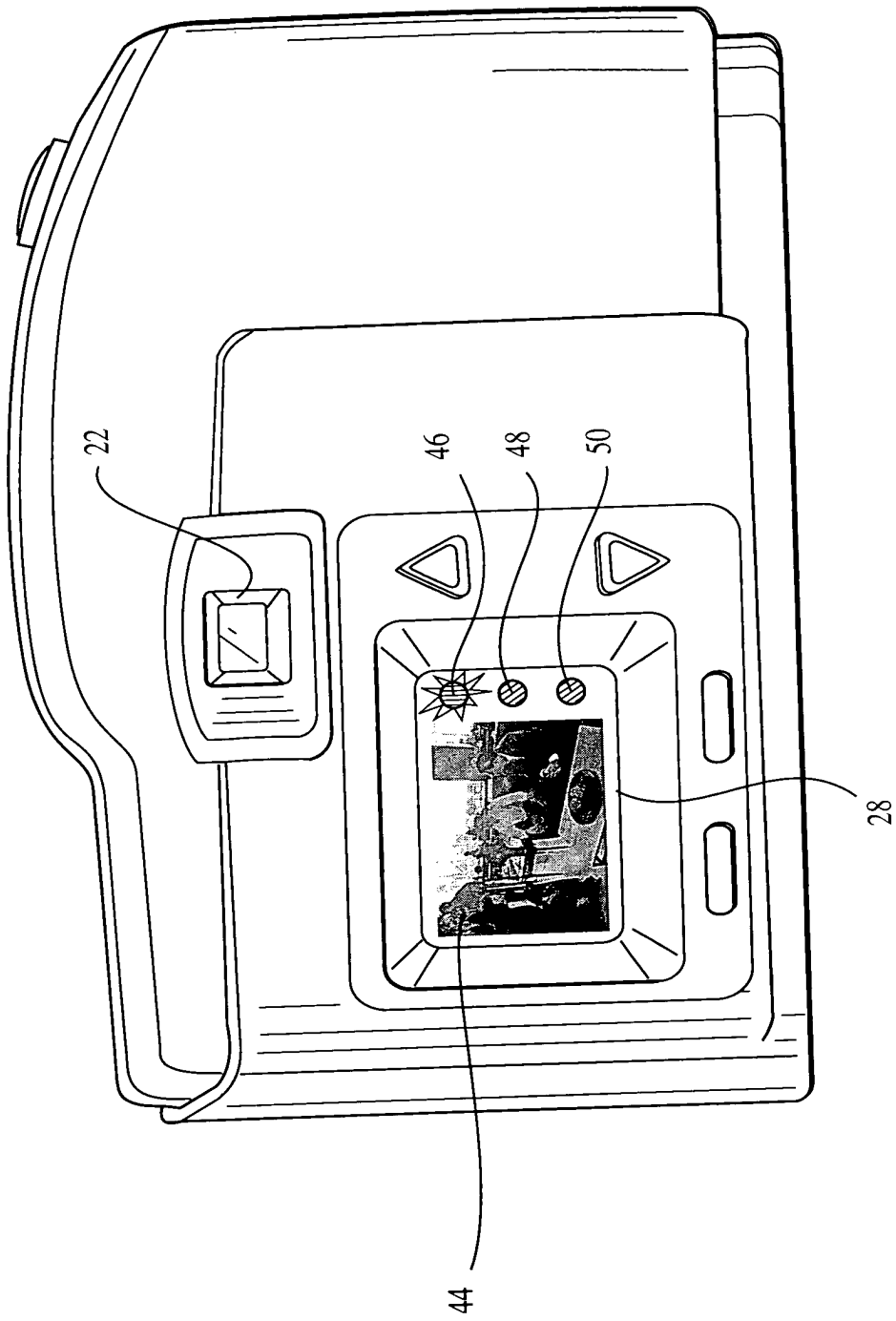


FIG. 9

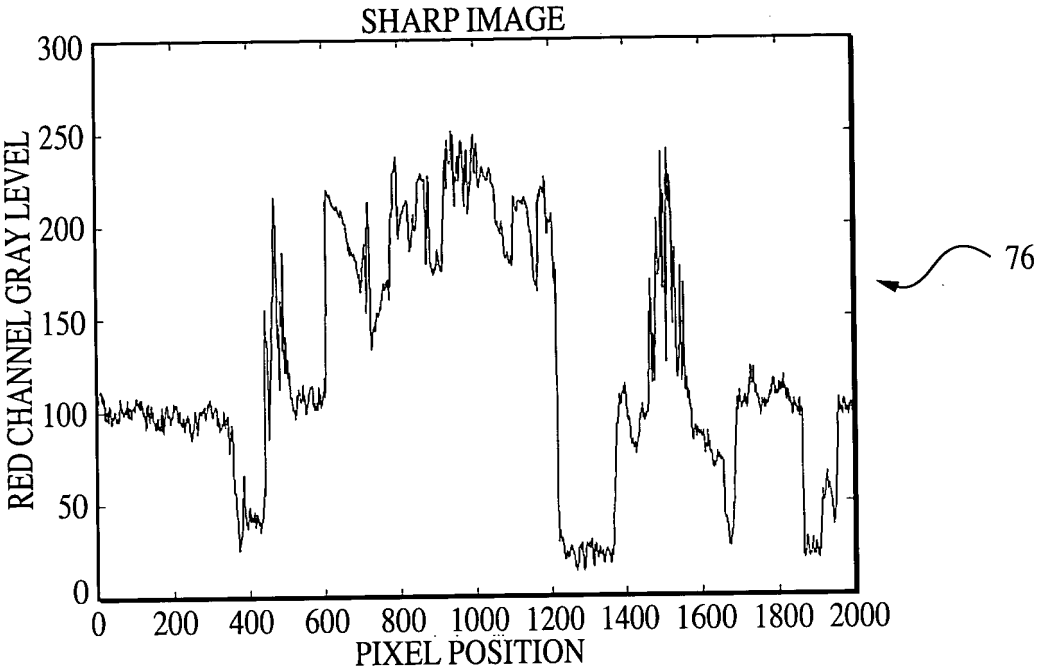

SHARP IMAGE
RED CHANNEL GRAY LEVEL
300
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
PIXEL POSITION
76

FIG. 10

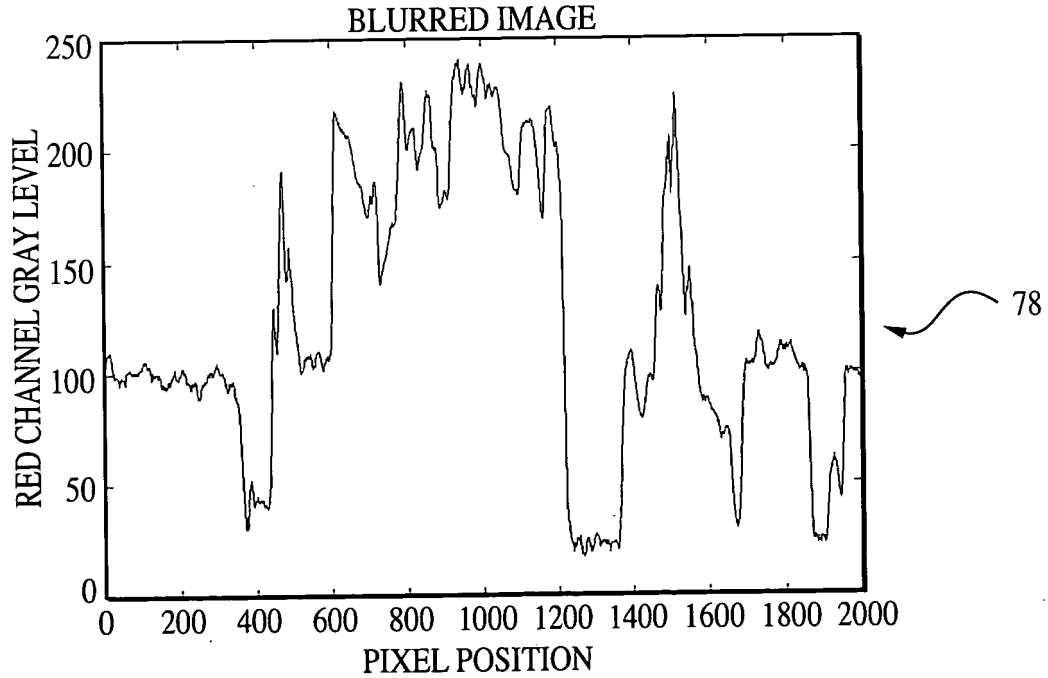

BLURRED IMAGE
RED CHANNEL GRAY LEVEL
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
PIXEL POSITION
78

FIG. 11

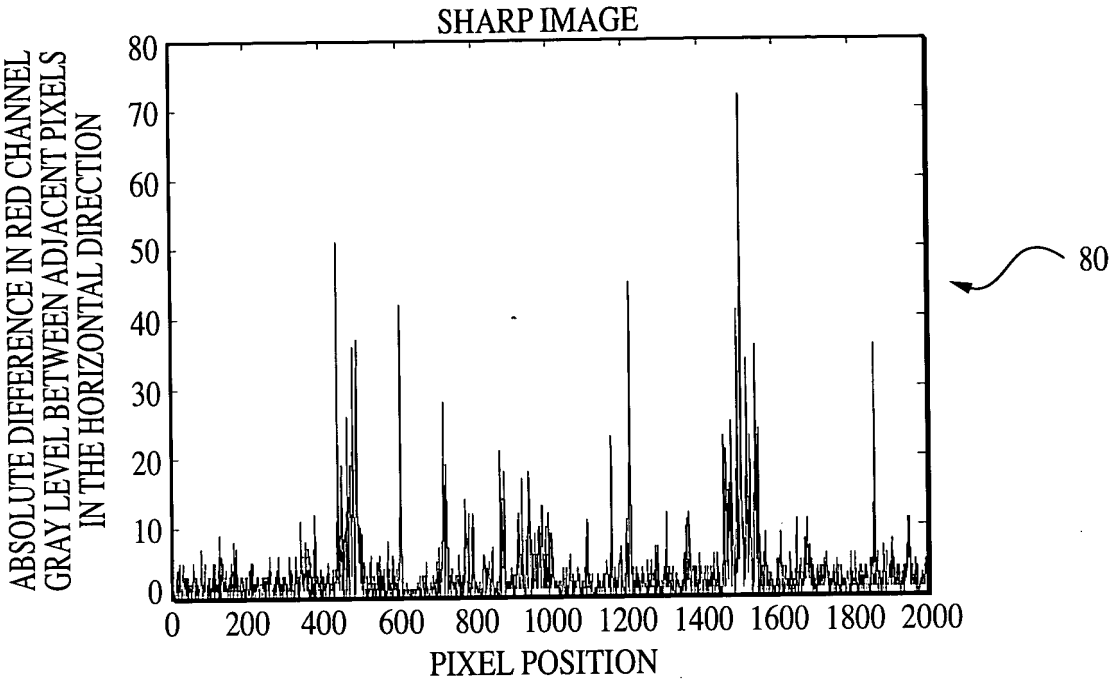

SHARP IMAGE
ABSOLUTE DIFFERENCE IN RED CHANNEL GRAY LEVEL BETWEEN ADJACENT PIXELS IN THE HORIZONTAL DIRECTION
0
10
20
30
40
50
60
70
80
0
200
400
600
800
1000
1200
1400
1600
1800
2000
PIXEL POSITION
80

FIG. 12

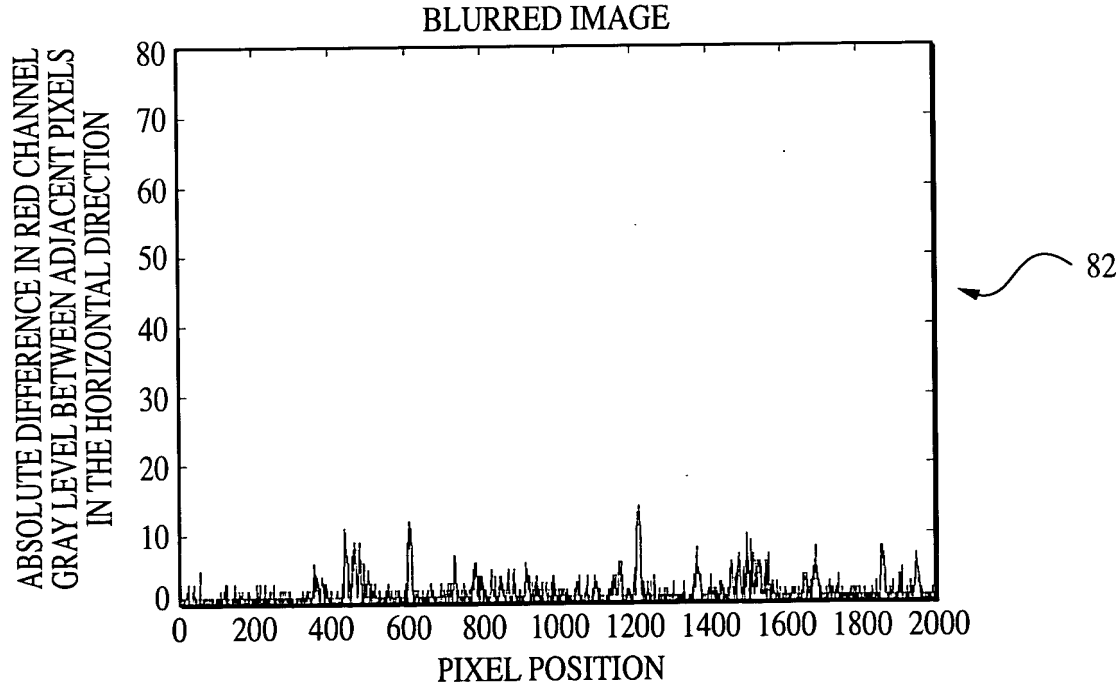

BLURRED IMAGE
ABSOLUTE DIFFERENCE IN RED CHANNEL GRAY LEVEL BETWEEN ADJACENT PIXELS IN THE HORIZONTAL DIRECTION
0
10
20
30
40
50
60
70
80
0
200
400
600
800
1000
1200
1400
1600
1800
2000
PIXEL POSITION
82

FIG. 13

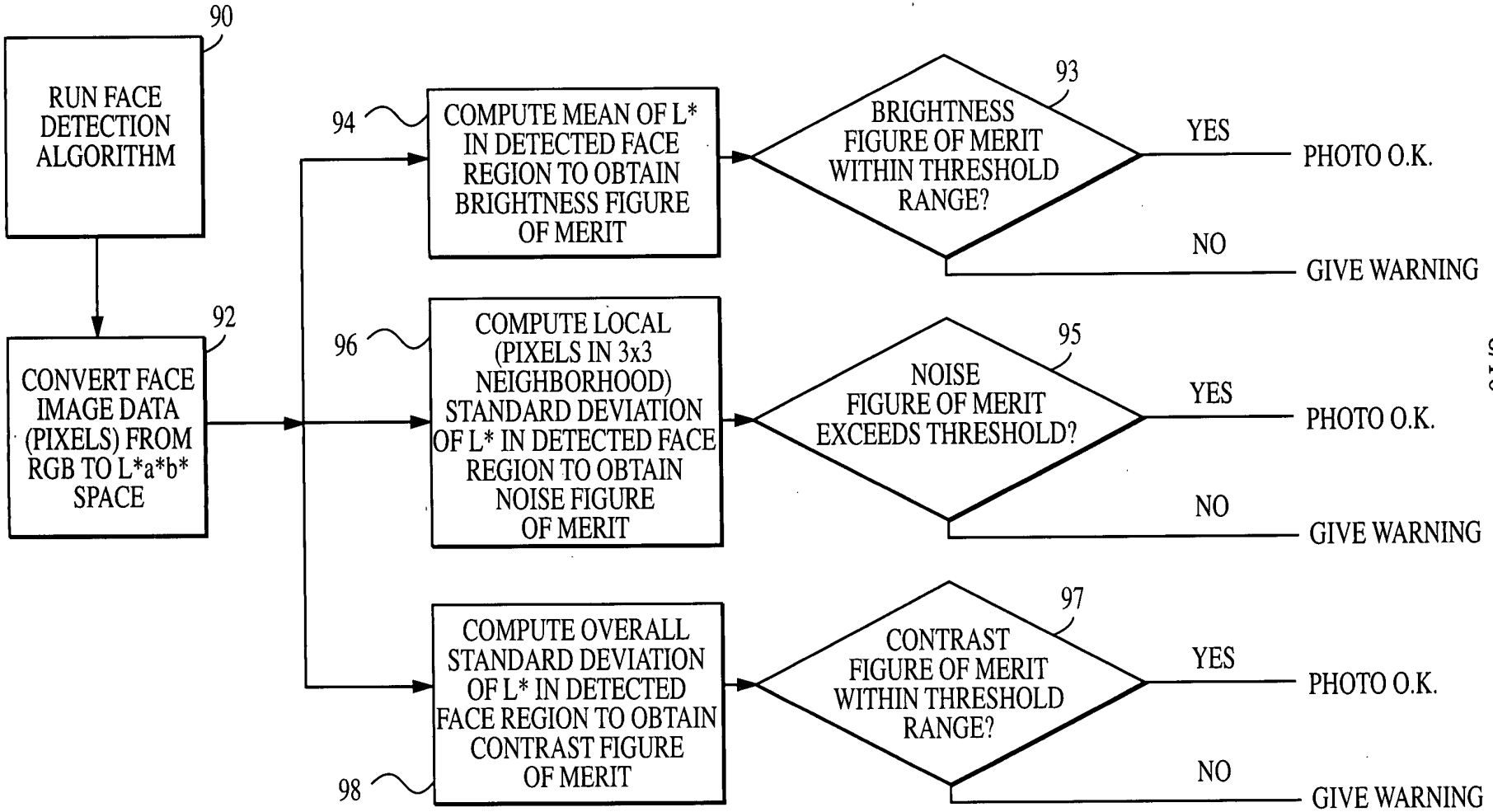

90
RUN FACE DETECTION ALGORITHM
92
CONVERT FACE IMAGE DATA (PIXELS) FROM RGB TO L*a*b* SPACE
94
COMPUTE MEAN OF L* IN DETECTED FACE REGION TO OBTAIN BRIGHTNESS FIGURE OF MERIT
93
BRIGHTNESS FIGURE OF MERIT WITHIN THRESHOLD RANGE?
YES
PHOTO O.K.
NO
GIVE WARNING
96
COMPUTE LOCAL (PIXELS IN 3x3 NEIGHBORHOOD) STANDARD DEVIATION OF L* IN DETECTED FACE REGION TO OBTAIN NOISE FIGURE OF MERIT
95
NOISE FIGURE OF MERIT EXCEEDS THRESHOLD?
YES
PHOTO O.K.
NO
GIVE WARNING
98
COMPUTE OVERALL STANDARD DEVIATION OF L* IN DETECTED FACE REGION TO OBTAIN CONTRAST FIGURE OF MERIT
97
CONTRAST FIGURE OF MERIT WITHIN THRESHOLD RANGE?
YES
PHOTO O.K.
NO
GIVE WARNING

FIG. 14

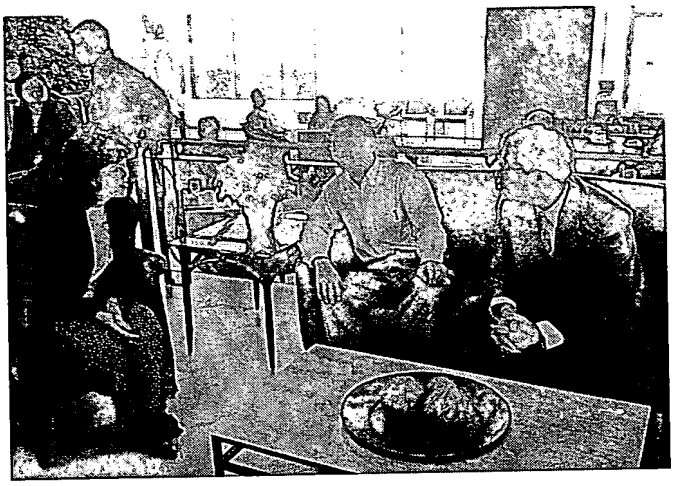

84

FIG. 15

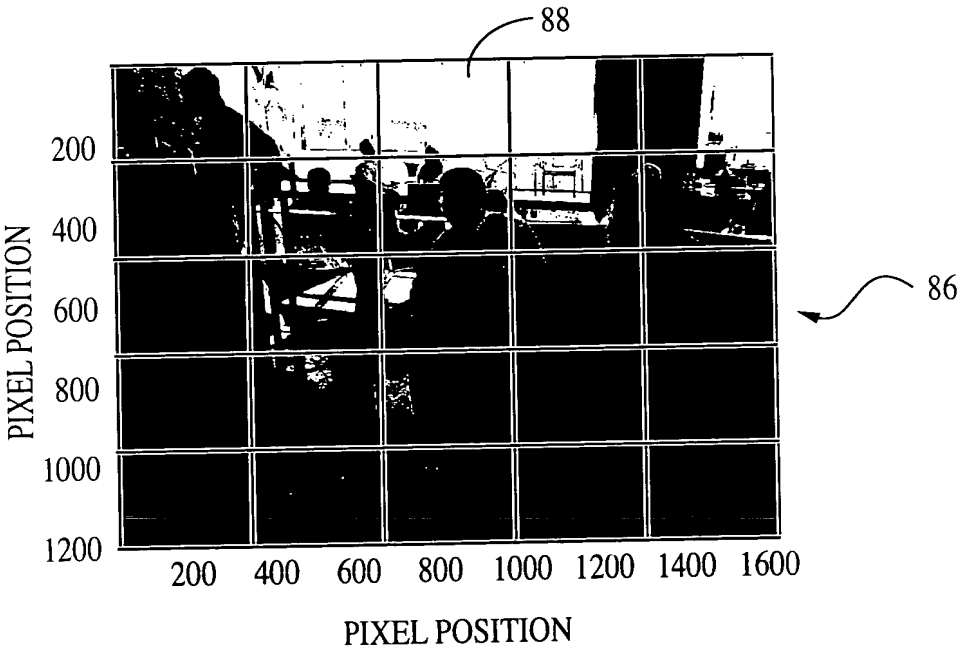
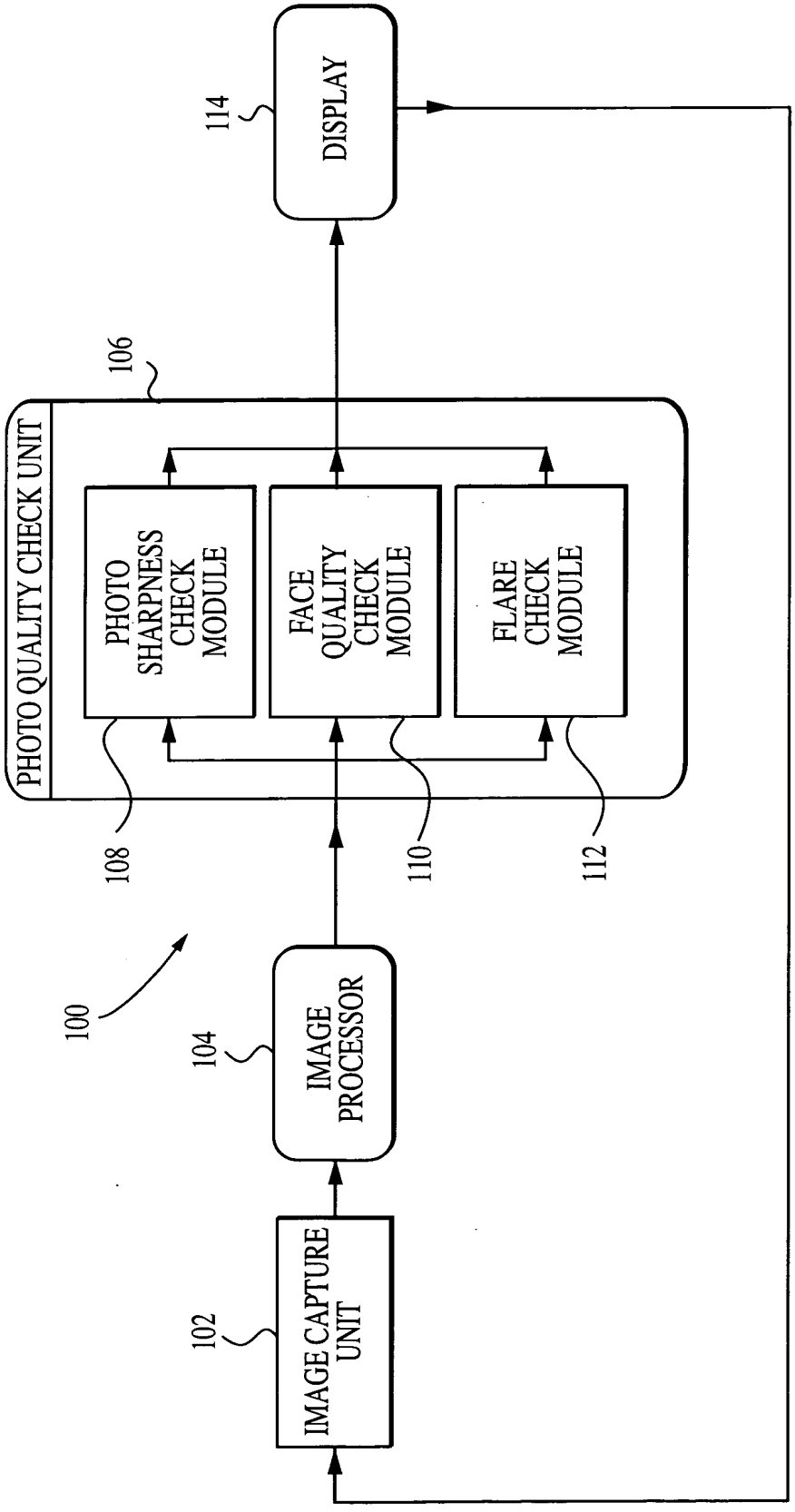

88
86
200
400
600
800
1000
1200
PIXEL POSITION
200
400
600
800
1000
1200
1400
1600
PIXEL POSITION

FIG. 16


100
102
IMAGE CAPTURE UNIT
104
IMAGE PROCESSOR
106
PHOTO QUALITY CHECK UNIT
108
PHOTO SHARPNESS CHECK MODULE
110
FACE QUALITY CHECK MODULE
112
FLARE CHECK MODULE
114
DISPLAY